

Mark Scheme (Results)

November 2012

GCSE Biology
5BI1H/01

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GCSE Biology 5BI1H/01 Mark Scheme – November 2012

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	A – adaptations		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	Any one from the following: • large surface area to facilitate heat loss (1) • insulating/fat layer (1) • correct adaptation of skin / fur / hair(1)	(thick layer) of bacteria credit observable valid 'suggestions' from the photo ref to not needing to regulate temperature as poikilothermic (1)	(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	A explanation to include two of the following points: • publishing the evidence and results in scientific journals (1) • getting other scientists to review their experiment / repeat the experiment (1) • scientists to investigate hydrothermal vents (1) • participating in scientific conferences to discuss experiment / results (1) • taking samples of organisms in hydrothermal vents for comparison (1)	use peer review (1) scientists searched the ocean (1) comparing notes/meeting with other scientists (1)	(2)

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	An explanation to include two of the following: • competition (occurs between members of a species) (1) • best suited / better adapted members out-compete and survive (1) • these members will reproduce (more times) (1) • the members who cope less well will die / extinction occurs (1) • reference to natural selection (1)	idea of survival of the fittest (1) reference to passing on genes to help them survive (1) reference to species interbreeding to form hybrids (1)	(2)

Question number	Answer	Acceptable answers	Mark
1(b)(ii)	A description to include the following: • the formation of a new species / new characteristics (1) • due to geographical isolation (1) • no longer able to breed with the original species	{development / evolution} of a {different type / new type} of species (1) due to separation from the original species / change of habitat (1)	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	B - eutrophication		(1)

Question Number	Answer	Acceptable answers	Mark
2a(ii)	Any two from the following: • (over use of) nitrates / phosphates fertilisers (1) • leaching into the lake(1) • sewage leakage into the lake (1)	flowing into lakes / washing into lakes (accept streams, rivers for lakes)	(2)

Question Number	Answer	Acceptable answers	Mark
2a(iii)	(plant growth) is increased / protein is made(1)	excessive/overgrowth of algae/plants on the surface	(1)

Question Number	Answer	Acceptable answers	Mark
2b(i)	An explanation linking three of the following points: • decomposers /decomposer bacteria (1) • bacteria /they break down dead animal and plant matter in the soil (1) • into ammonia (1) • {ammonia / nitrites} is/are converted into nitrates (1) • by nitrifying bacteria (1)	ref to nitrogen fixing bacteria (fixing nitrogen) (1)	(3)

Question Number	Answer	Acceptable answers	Mark
2b(ii)	denitrifying (bacteria) (1)	named bacteria e.g <i>Thiobacillus denitrificans</i> , <i>Micrococcus denitrificans</i> , <i>Serratia</i> , <i>Pseudomonas</i> , and <i>Achromobacter</i>	(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	B – 1.1		(1)

Question Number	Answer	Acceptable answers	Mark
3 (a) (ii)	continuous (data / variation)		(1)

Question Number	Answer	Acceptable answers	Mark
3(a) (iii)	$\frac{18}{60}$ (1) $0.3 \times 100 = 30(\%)$ (1) Or $0.33 \times 100 = 33(\%)$ (1)	correct answer 2 marks	(2)

Question Number	Answer	Acceptable answers	Mark
3(b) (i)	An explanation to include four of the following: • hypothalamus controls body temperature(1) • causing the body to sweat (more) (1) • (sweating cools the body by) evaporation of water / sweat (1) • vasodilation (of blood vessels) (1) • heat lost by radiation (1) • this is called negative feedback (1)	explanation of vasodilation – more blood flowing near surface of skin hairs lie flat on skin (so no insulation) (1)	(4)

Question Number	Answer	Acceptable answers	Mark
3(b) (ii)	An explanation to include two of the following: • muscles (contract and relax)(1) • friction (1) • releasing heat by respiration (1)		(2)

Question Number	Answer	Acceptable answers	Mark
4a(i)	A – central nervous system		(1)

Question Number	Answer	Acceptable answers	Mark
4a(ii)	4 – 7 weeks	Accept 4 ½ - 7 ½ 4 – 7 ½ 4 ½ - 7	(1)

Question Number	Answer	Acceptable answers	Mark
4 b (i)	A definition including any two of the following: • a chemical substance (1) • has an effect on the body / nervous system / brain (1) • causing psychological / physiological / behavioural changes (1)	causing changes in behaviour / addiction	(2)

Question Number	Answer	Acceptable answers	Mark
4b(ii)	An explanation including two of the following: • increases reaction times / slows down impulses / reactions(1) • slows down the activity of the brain / nervous system (1) • acts on neurotransmission /at the synapse (1)		(2)

Question Number	Answer	Acceptable answers	Mark
4c(i)	A description linking the following points: • addiction / alcoholism (1) • liver / brain /kidney damage (1) • cirrhosis / cancer (1)	accept – other organ damage related to alcohol abuse but ignore lung damage	(2)

Question Number	Answer	Acceptable answers	Mark
4 c (ii)	A suggestion linking two of the following points: • alcoholics have caused their liver to fail by their addiction (1) • if alcoholics continue to drink, the organ could be damaged (1) • other people may deserve the liver transplant more (1) • addiction is an illness(1) • everybody has a right to life (1)	alcoholics damage their own liver / people choose to be alcoholics it is not their fault they are addicted alcoholics may die if they do not get a transplant	(2)

Question Number	Answer	Acceptable answers	Mark
5a (i)	D - ff		(1)

Question Number	Answer	Acceptable answers	Mark
5a (ii)	An explanation linking two of the following: • mucus blocks (pancreatic) duct /small intestine wall / digestive system(1) • preventing enzymes/named enzyme being released (into small intestine) (1) • less digestion of food (1) • less absorption (1)		(2)

Question Number	Answer	Acceptable answers	Mark
5b (i)	an individual who has one recessive allele and one dominant allele (1)	2 different alleles	(1)

Question Number	Answer	Acceptable answers	Mark
5b (ii)	An explanation to include two of the following: • Rebecca is homozygous dominant(for CF)(1) • Rebecca has (inherited) one dominant allele from each parent(1) • cystic fibrosis involves the inheritance of two recessive alleles (1)	Rebecca has (inherited) 2 dominant alleles	(2)

Question Number	Indicative Content	Mark									
QWC *5(c)	An explanation including the following points: - A Punnett square or genetic diagram showing the following gametes and offspring <table border="1" data-bbox="413 443 890 660"> <tr> <td></td><td>D</td><td>d</td></tr> <tr> <td>d</td><td>Dd</td><td>dd</td></tr> <tr> <td>d</td><td>Dd</td><td>dd</td></tr> </table> - mother gametes = d, d - father gametes = D, d - offspring = 50% Dd, 50% dd - probability of offspring with sickle cell disease = 50% - probability of carrier / heterozygous = 50% - both parents will give one allele to the possible offspring - the father can give either the dominant or recessive allele - the mother can only give a recessive allele - a dominant and recessive allele will result in heterozygous offspring		D	d	d	Dd	dd	d	Dd	dd	(6)
	D	d									
d	Dd	dd									
d	Dd	dd									

Level	0	No rewardable content
1	1-2	- Limited written explanation is provided by the candidate of the inheritance and / or a genetic diagram/ Punnett square with only correct gametes or offspring - the answer communicates ideas using simple language and uses limited scientific terminology - spelling, punctuation and grammar are used with limited accuracy
2	3-4	- The genetic diagram/ Punnett square is correct for both gametes and offspring with a simple explanation - the answer communicates ideas showing some evidence of clarity and organisation and mostly uses scientific terminology appropriately - spelling, punctuation and grammar are used with some accuracy
3	5-6	- The Punnett Square/genetic diagram is complete and accurate for both gametes and offspring plus percentage outcomes and a detailed explanation of inheritance of CF - the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately - spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6a (i)	B – the glucose content of their blood		(1)

Question Number	Answer	Acceptable answers	Mark
6a (ii)	An explanation linking three of the following points: • (the hormone) insulin (1) • (insulin)is injected (into subcutaneous fat) (1) • use a low carbohydrate /healthy diet (1) • (increase) exercise (1) • to lower blood glucose levels / when blood glucose levels get too high / regulate glucose levels(1)	use of epipen	(3)

Question Number	Answer	Acceptable answers	Mark
6b	Body Mass Index calculation: $120/1.8^2$ (1) 37 (1)	ecf for correct manipulation with incorrect figures	(2)

Question Number		Indicative Content	Mark
QWC *6(c)		An explanation including the following points in a logical order: • a reflex response is an involuntary response • reflex responses do not involve the brain • reflex responses involve sensory neurones • reflex responses involve relay neurones • reflex responses involve motor neurones • relay neurones are in the spinal cord • impulses travel along neurones as electrical signals • the axon is insulated by the myelin sheath • which ensures the electrical signal does not lose energy • at the junction between two neurones there is a synapse • the message is carried across the synapse by neurotransmitters • the message travels from the stimulus along the axon and dendron of the sensory neurone to the spinal cord • the reflex arc is important to keep the body safe	(6)
Level	0	No rewardable content	
1	1-2	• A limited written explanation of some of the neurones involved in the reflex arc or a limited explanation of how messages /impulses are transmitted as electrical signals • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	3-4	• A simple explanation of the neurones involved in the reflex arc in the correct order, with the method of transmission along neurones, one neurone may be missing or a detailed description of all of the neurones in the reflex arc and the role of the CNS • the answer communicates ideas showing some evidence of clarity and organisation and mostly uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	5-6	• A detailed explanation of the neurones involved in the reflex arc in the correct order, with the method of transmission along neurones including the role of the synapse and/or myelin sheath. • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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